AMPLIFICATION OF PARTIAL RICE FLORIGEN FROM MALAYSIAN UPLAND RICE CULTIVAR HITAM AND WAI

ABDULRAHMAN MAHMOUD DOGARA

UNIVERSITI TEKNOLOGI MALAYSIA

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ABDULRAHMAN MAHMOUD DOGARA

A dissertation submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Science (Biotechnology)

Faculty of Biosciences and Medical Engineering
Universiti Teknologi Malaysia

JANUARY 2015

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This research work has been dedicated to my late mother Hajiya Ramatu. May ALLAH reward her with Aljannah Firdausi and her soul rest in peace.Ameen.

ACKNOWLEDGEMENT

First and foremost, I give special thanks and glory to the Almighty ALLAH for giving me the grace, wisdom and good health to complete this research work. I am also indebted to my supervisor Dr Zaidah Rahmat who guided and helped greatly towards the completion of this work, may ALLAH reward her abundantly. Ameen

My special appreciation goes to my father Alhaji Mahmoud Dogara and my late Mother Hajiya Ramatu may Allah reward them with Aljannah Firdausi. Ameen

Also to my loving wife, Razeeqa Shafiu for her continuing source of help and encouragement, her unalloyed love, support and understanding, her endurance day and night, always give me the confidence to work very hard while I was in struggle for existence and survival of the fittest.

Finally to all members of Plant Biotechnology Laboratory more especially Shahkila Mohammed Arif for the encouragements all the times.

ABSTRACT

Rice is one of the global sources of food where it is grown in almost 148 million hectares annually with about 11% of the world planted land. Wetland rice is commonly grown and required extra land for good irrigation system. To compensate for land scarcity, upland rice which requires less water consumption is one alternative. Regardless of wetland or upland, rice is still being planted once a year all over the world although it could be harvested faster during short day condition. To meet global rice demand, there is a need to understand the effect of photoperiod on rice florigen and flowering to produce better yield. The aim of the study was to amplify rice florigen from Malaysian upland rice to improve its potential by amplifying *Hd3a* and *RFT1* genes. Following amplification and verification via sequencing, cloning of the purified PCR product and construction of phylogenetic tree was carried out. Malaysian upland rice is grown in long day condition hence only partial *RFT1* gene was successfully isolated. The partial gene sequence was aligned with 10 other *RFT1* gene belonging to Indica and Japonica varieties and showed that Malaysian upland rice cultivars Hitam and Wai evolved from Japponica cultivars. Findings from this study suggested high similarity of *RFT1* gene between various cultivars and further research on this gene is hoped to provide better understanding of flowering time of Malaysian upland rice for crop improvement.

ABSTRAK

Beras adalah salah satu sumber makanan global di mana setiap tahun ia ditanam di hampir 148 juta hektar iaitu kira-kira 11% daripada tanah dunia. Padi sawah adalah jenis yang biasa ditanam dan memerlukan tanah tambahan untuk sistem pengairan yang baik. Untuk mengimbangi kekurangan tanah, padi tanah tinggi yang tidak memerlukan penggunaan air yang banyak adalah satu alternatif. Tidak kira kawasan paya atau tanah tinggi, padi masih ditanam sekali setahun di seluruh dunia walaupun ia boleh dituai lebih cepat dalam keadaan hari siang yang pendek. Bagi memenuhi permintaan beras global, terdapat keperluan untuk memahami kesan fotokala pada florigen padi untuk menghasilkan hasil yang lebih baik. Tujuan kajian ini adalah untuk mengamplifikasi florigen padi dari padi tanah tinggi Malaysia untuk meningkatkan potensinya dengan amplifikasi gen *Hd3a* dan *RFT1*. Setelah proses amplifikasi and pengesahan melalui penjujukan, pengklonan PCR produk tulen dan pembinaan pokok filogenetik telah dijalankan. Padi tanah tinggi Malaysia ditanam dalam keadaan hari siang yang panjang maka hanya sebahagian gen *RFT1* berjaya dipencilkan. Urutan jujukan sejajar dengan 10 gen *RFT1* lain daripada variasi Indica dan Japonica menunjukkan bahawa kultivar Hitam dan Wai berasal daripada padi tanah tinggi Malaysia mempunyai evolusi sejajar dengan variasi Japponica. Hasil daripada kajian ini mennunjukkan persamaan yang tinggi antara gen *RFT1* daripada pelbagai kultivar dan penyelidikan lanjut mengenai gen ini diharapkan dapat memberikan pemahaman yang lebih baik daripada masa berbunga padi tanah tinggi Malaysia untuk penambahbaikan tanaman.